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ABSTRACT

A study was initiated to investigate the current status of technology initiatives in terms of their impact on six adult education centers in Massachusetts. It was designed to provide new insights into the educational effects of computer instruction upon adult basic education students. A second effort focused on the presentation of a model of statewide technology transfer and diffusion. The site reviews indicated that the centers serve a very diverse clientele; the main programs offered were adult basic education and English as a second language; and each center was organized as a service site to reach out to clients. Project activities were aimed at designing and operating computer literacy programs for adult educators; designing and offering a software leadership institute for training trainers; providing microcomputer equipment for instructional purposes through a lease/purchase arrangement; designing an administrative database to be field tested in two adult learning sites; and documenting and disseminating findings from these technology initiatives and new practices. Recommendations were made that will assist future planning by adult educators who are studying and exploring ways to optimize the use of technology within their educational and training settings. (Appendixes include workshop agendas, software evaluation forms, the Philadelphia Department of Education's list of adult education courseware, and a 33-page bibliography of print resources and courseware.) (YLB)

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ADULT EDUCATION REPORT

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PROJECT A STATEWIDE APPROACH TO COMPUTER APPLICATIONS FOR ADULT LITERACY PROGRAMS

FOCUS

The need to better understand the use of technology in the development and delivery of adult literacy education.

PURPOSES

- Assist the Massachusetts Department of Education in designing and implementing a comprehensive process for the application of computer technologies.

- Establish statewide initiatives in the instructional and administrative areas as they relate to the integration of technology for adult literacy education.

SUMMARY

The Department of Education has identified a statewide network of adult educators to convene for the purpose of developing computer technology initiatives and technology applications for adult literacy education. Through meetings with the planning group and members of the Massachusetts Department of Education, a statewide Massachusetts model with comprehensive plans for areas specific to technology was developed. Five major program goals were established: (a) design and operate computer literacy programs for adult educators; (b) design and offer a software leadership institute for training trainers; (c) provide microcomputer equipment for instructional purposes through a lease/purchase arrangement; (d) design an administrative database to be field-tested in two adult learning sites; (e) document and disseminate findings from these technology initiatives and new practices.

MAJOR BENEFITS

- Building experience and capacity for major initiatives in the high impact area of technology

- Field testing computer applications for the benefit of adult learners

- Identifying information that can be shared about the new practices for dissemination in the statewide network.

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FOREWORD

Early in 1983, the Massachusetts Department of Education and its Adult Basic Education Division initiated activities in the application of technology for programs relating to the adult learner. This program began with the Department of Education identifying a statewide group of adult educators to convene for purposes of developing computer technology awareness sessions and planning statewide initiatives in technology. Six adult learning sites, located in the major geographical areas of Cambridge, Worcester, Springfield, Pittsfield, New Bedford and Lowell, were selected for participation in the initial endeavors with personnel from the Adult Basic Education Division. The Merrimack Education Center and its Lighthouse Technology project provided technical assistance to the program.

This present study and report was initiated by the Massachusetts Department of Education, Adult Education Division, to investigate the current status of technology initiatives in terms of their impact on six adult education organizations. This study was designed to provide a number of new insights into the educational effects of computer instruction upon adult basic education students. A second effort in this study focuses on the presentation of a model of statewide technology transfer and diffusion. It is hoped that this report will enable state planners and administrators to explore the impact of advancing technologies and to determine what response is appropriate in becoming more familiar with alternatives for the future.

The first section of this report presents a survey of the new technologies and their impact on adult literacy. The second section describes the process used to gather appropriate information for this report and the review of information from each of the organizations. An interview protocol was prepared and staff at each site were interviewed. A summary of the current activities and suggested recommendations for the forthcoming year, 1984-1985, are presented in the remainder of this report. A comprehensive bibliography includes references from the various states that are pertinent to this report.

INTRODUCTION

Adult Education and the New Technologies

Communications technologies are changing the world of work; moving from an industrial economy to an information society will have profound effects on training requirements as programs are required for preparation of worker skills. Just what does this mean for the unemployed or under-employed adult? How can we take a practical view of these training requirements, in terms of those workers who do not have college training or who are just now meeting GED requirements? This introductory information is presented here to give an overview and perspective for viewing the status of technology in adult education in Massachusetts to begin to address some of these issues and concerns for up-to-date technoloy.

In MegaTrends, Naisbett has outlined the growth of the information economy, paralleling the growth of the service sector, including those enterprises that make the machines that handle information, run the communications networks, and use technology to provide information products and services. Information service industries include computers, robotics, biotechnology and transmission technologies such as laser and fiber optics. All of these industries will require some exposure to new "technologies" what the French have called "telematics." New occupations and jobs to fill them are likely to emerge; cable television services and national newspapers, for example, are two new businesses that would not exist were it not for advanced satellite technology.

New technological developments, such as the video cassette, the videodisc and public access cable place a greater premium on the ability of individuals to use these technologies in their work, at home and for political and social participation. One must be literate in order to fully participate in economic, political and social activities of our society today.

While goals of mass literacy--defined as reading, writing and other "basics"--have in many cases been met, newer goals and definitions of required skills for literacy are now appearing. Definitions of what is "basic" have shifted emphasis -- the ability of individuals to use an information system to help them at home and at work is one of today's essential skills. Newer definitionsof adult literacy include the ability to communicate and use interactive technologies. T. W. Schultz[1], in Investment in Human Capital, describes this literacy as a basic necessity for economic growth--for the individual and the nation.

Improvements in the quantity and speed of information storage and communications have profoundly affected information handling and how individuals and organizations communicate and use information for learning. This, in turn, has altered needs for mass literacy to work with printed material and a diversity of broadbase information technologies (e.g., cable, satellite communication, digital telephone, computers, video technology, etc.).

> For many people, knowing how to find, assemble, and interpret information will be more important than accumulating a life-long portable storehouse in their heads. Education will be the primary mechanism preparing people for the information society, and will, in turn, be influenced by the technologies and the knowledge demands of the information society.[3]

With rates of information generation accelerating, educational emphasis will be on lifelong learning, retraining and updating knowledge, rather than on "schooling" which is terminated at the completion of a standard curriculum. Additionally, new technological literacy is expected to provide ways to deal with the very complex and difficult problems facing society because technology is a tool for learning and solving problems.

Educational curricula will, therefore, increasingly focus on learning how to learn rather than on learning facts and concentrate on process and procedures of using the technology tools available to us. A definition

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[1]Schultz, Investment in Human Capital, Academic Press, 1982.

[2]Coates, "Environmental Consequences of Developing Communications Technologies." Washington, DC: J. F. Coates, Inc., 1981.

[3] ibid.

of literacy" for modern-day society will certainly include the proclaimed need for a focus on "how to learn"; and, this redefinition will examine the influence that new technologies will have on clients in adult basic education. Some futurists [4] describe new technological environments and the emergence of completely new types of educational institutions based on information technology, and a radical transformation of existing "schools" still to come.

> Because information workers are generally assumed to require literacy skills more than workers in other types of jobs, these trends suggest that the country is experiencing a rise in the level of literacy needed to find and hold jobs. The definition of functional literacy may need to be altered to include the ability to use computer-based knowledge. [5]

The Shifting Job Market

Changing dimensions will occur in the work force. The nature of clients we see in adult basic education courses, the needs of the industrial sector (employers), and how we deliver adult basic education are all undergoing significant change.

> The growing complexity of society, coupled with the automation of unskilled jobs, will make it increasingly difficult for semi-literate individuals to lead useful and productive lives... A predicted tighter labor market in the next few decades will place a greater premium on skilled, productive labor [6].

From 1949 til the 70's, about eight thousand occupations disappeared from the United States labor market largely because of the spread of automation; more than six thousand new occupations developed over that same period.[5] Jobs in the "smokestack" industries will continue to

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4 M. Frobe, et al. Telecommunications and Higher Education, Occasional Paper No. 3 (Pittsburgh, PA: Institute for Higher Education of Pittsburgh, 1981.)

5 E. Ginzbert and G. Vojta. "The Service Sector for the U. S. Economy." Scientific American, Vol. 244/3, March 1981, pp. 48-55.

6 Stanley Grabowski. Preparing Educators of Adults. (San Francisco: Jossey-Bass, 1981) Learning at the Back Door. Madison, Wisconsin: University of Wisconsin, 1981.

decline as there are new opportunities that open up in service and high-tech sectors. "Even traditional jobs will increasingly require the handling of automated equipment--in the office and the factory."[7]
Sectors of the new "information industry" are projected for rapid growth in The United States: An Information Society indicating that, by conservative estimates, the information industry is growing at a rate of over 20 percent per year. Emerging technologies will lead to two major types of occupational shift: first, a new tier of industries will emerge to become the heart of the information-centered economy. Second, the emergence of "an intelligent work place" in the traditional sectors of the economy-- with microcomputers incorporated on the desk of every employee.[8]

The current revolution may eliminate many lower level skill jobs while creating new occupations that demand new skills. The increased complexity of much automated equipment is expected to increase the need for certain occupations and skills.[9] Two of the fastest-growing occupations, however, will be technicians to repair all of the computer and electronic equipment, and health technicians to operate all the new medical equipment being developed.

What is needed for Massachusetts adult educators at this point in time is an examination of these emerging trends in order to assess their stability and related skill requirements that will impact training goals. Although it is presumptuous to project on a long-term basis into the Year 2000, we do know that the impact of changing technologies continues to render previous programs obsolete and this effects current training needs and employment trends.

Interactive Technologies--the Future of Adult Education

Few employees at the end of this decade will have jobs that are untouched by the new communications technologies. A resulting increase in job skill requirements still holds further potential for economic growth as the link between education, training and economic growth becomes even more critical. Thus, training and retraining, because of rapid technological advancement, are expected for the future role of adult basic education. "Many occupations may become so transient that complete retraining may be required every four to five years."[11]

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7 R. Seidel et al. (Eds.) Computer Literacy. New York: Academic Press, 1982.*

8 Office of Technology Assessment, op. cit.

9 Singer, 1982

10 Barker, 1979.

11

Consider the costs of training and the huge budgets for manpower development in industry. Newer technological advancements require that this "retraining" of displaced workers be done more frequently during the course of people's lives. Training programs lag behind industry in use of modern equipment. Furthermore, there has been an insufficient response by traditional schooling to the needs for these increased skills in math, technical and computer literacy. In fact, schools have moved away from a science and technology curriculum.[12]

Job-related education can be enhanced by the new information technologies. Increasing the amount and efficiency of "worker-related education" seems central to improving the national economy Furthermore, these work related skills, such as those for word-processing, can be taught while meeting adult basic education requirements.

1. Access to computers can provide opportunity to practice and learn basic skills.

2. New information technologies allow educators to provide specialized services to specific clients.

High technology is not envisioned as a panacea for employment; however, the current view of high-technology employment for the rest of this decade is optimistic.

> [Many] see promise in the application of technology to existing industries and the use of technology to create new industries. Older industries are turning to high technology to help them compete.[13]

In fact, reaching out to provide non-traditional services to new categories of clients and working more closely with business and industry, are two areas where adult education services may be particularly suited to take advantage of these new information technologies. A wide variety of education services, where technology applications can assist, includes:

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[12]Schultz, op. cit.

[13]Pollack

Educational Service Applications

- Diagnostic-prescriptive for job training skills
- Counseling and career advice.
- Life skill programs.
- Technical productive skills.
- Client referral and follow-up

Investing in Technology--State Initiatives

Rapidly burgeoning technologies and applications of newer technologies, including wide adoption of word processors, microcomputers, and other applications of technological breakthroughs, are changing the marketplace for jobs. The effect of this wide adoption on employment and on upgrading and retraining of workers is only beginning to be felt. Carnevale[14] has noted that this technology will result in "new productivity, products and wealth, which in turn create demands for new products and services, thereby creating more, not fewer jobs" in a spiral effect. Developing skills for these new technologies will require new and continuing training and retraining.

Statewide planning efforts are critical to the long-range health of the economy. Better technology is only a part of our environment; indeed, human capital investment is called for and is expected to account for a larger share of productivity growth than even machine capital. Thus, it is increasingly important that adult education staff keep up-to-date on what is happening in the development of technology throughout the state and nation.

It is practical for the first time to suggest three long-term goals of education that can be increasingly met as a result of advanced technologies:

(a) mass education -- such that every citizen of a nation or of a state can be effectively exposed to useful and desired knowledge.

(b) specialized education -- tailor-made to fill the needs of the individual.

(c) continuing life-long education -- to develop human values, to meet shifting occupational needs, to respond to fresh training requirements, and to make each of us fully effective (as knowledge can) in life choices. [15]

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[14] Carnevale,

[15]

Because our society is moving rapidly toward high technology, so must our adult education programs. The boundaries between entertainment, public information and educational services become blurred. A Shakespeare play, a concert or an informational series such as Cosmos may all be considered important instructional resources as well as entertainment. (emphasis added).[16] Adult educators are among the first to incorporate such client-centered services as "distance learning", client-referral and on-the-job training. The computer and computer assisted instruction has a major role in accomplishing these three goals. In Appendix A we have included a model for considering the evolution of technology regarding how it will affect the future of adult services so that these major goals can be met.

The staff at the adult basic education learning centers are presently confronting the need to develop their own technological literacy and to devise strategies for integrating technology into their programs at all levels and with all client populations. Word processing has taken hold and offers the most extensive preparation at these sites. Microcomputers for teaching basic skills is lagging behind these established word processing courses. In 1984, two sites installed IBM/XT for their administrative record-keeping purposes.

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[16]Office of Technology Assessment, op. cit.

II. Massachusetts Initiatives -- Technology Support Endeavors

A. Phase One.

In 1983, Massachusetts Department of Education, with the adult education centers, recognized the need for introducing technology into programs for the adult learner. MDE commissioned a set of activities incorporated into six adult learning centers across the State: Cambridge, Lowell, New Bedford, Pittsfield, Springfield, and Worcester.

Activities in these centers began in the early months of 1983 when each center received a mini-grant allocation of $5,000 each to begin the implementation of technology initiatives through June of 1983. Additional funds were then allocated as of July, 1983, continuing to support these activities in the fiscal year '84.

Several objectives were set for this implementation endeavor:

1. To pilot the use of computers in six urban adult learning centers.

2. To conduct computer literacy training.

3. To develop Statewide Software Leadership Institute

4. To evaluate existing instructional software for use by adult students

5. To initiate database administrative systems in two locations

6. To develop and implement networking activities according to computer usage with their adult students/ clients.

A Review of Needs.

Early in 1983, several of the adult learning center sites were visited and a review and summary prepared to describe needs as perceived in each of these centers. This review at each site served to determine local expectations about operations and how available computers and operations could become part of a State network of Adult Learning Centers. Some of the findings are generic to the six sites and some are specific to the local centers.

Common Perspective.

Clearly, the clientele served by the six centers is very diverse when compared with elementary and secondary education, and especially when compared with those who attend postsecondary, collegiate-level programs. These demographic variables account for the diversity: primary language, learning pattern and style, and educational background. Some centers have a majority of clients in ESL. "Learning patterns range from intense discipline and commitment, which achieves significant advances quickly, to intermittent approaches that evidence only small steps in learning." A highly mobile life style, poverty, ill-health and family behavior patterns also contribute to the needs for teaching and program offerings at the sites.

Programs at the Centers.

The main programs offered are ABE and ESL. Adult Basic Education (ABE) provides "the basics" to those at reading grade levels zero through eight. This program also offers instruction to those who possess a language other than English as their native tongue (ESL). A student/client who completes ABE may attend an adult diploma program whereby a high school diploma could be awarded (GED). Some actually attend evening high school courses and others study for the GED test. Classes are offered and the five tests for passing GED are offered

periodically. Some of the centers have very large evening adult education courses that are administered under the same leadership. The most usual pattern of students is ESL, then ABE, then GED. There is no tuition requirement for ABE; students must attend at least 12 hours in order to be "enrolled" and attendance less than this number does not couint toward the person being equivalent to one enrolled. State reports are compiled to show attendance of these enrollees and their progress.

Organization.

Each of the six centers has a full-time director who is responsible to oversee all functions. In each case, all seem expert in leadership and delegation and organizing their learning center site. In some center sites, full time staff are minimum in number; in others, there are a few permanent full-time staff members who oversee major functions within the program. Some centers operate with nearly all part-time staff.

Each center is organized as a service site to reach out to clients. This "marketing" is not extensive and is often by word of mouth. Even with "level" funding, budgeted funds for such programs continue to decline; negotiated salary increases really mean decline in actual available operating funds.

Directors of the programs are extremely busy with the many tasks required and organizing the center activities. Declining funds have resulted in additional functions being aggregated to those who remain. Thus, the addition of computer managed record keeping and computer assisted instruction at first, appears to be an added burden. Given the fact that many part-time staff are trying to accomplish these tasks, the role is "marginal" in the sense of this over-burden.

Constraints Identified Early

Most centers originally had little computer contact and less expertise. Some of the larger centers had courses offered in word-processing with fairly modern equipment as part of the high school's contribution to adult evening classes. Constraints identified appeared to arise from a realistic appraisal of present operations and the actual assessment of needs in a "laundry list" detailed what they would like the new equipment to do.

Record-Keeping.

From the interviews at each site and from an examination of forms and records maintained in a manual file, the MEC consultants reviewed the task to complete State information and reporting requirements. In particular, this involved registration/intake data, attendance data, and instructional use for CAI. Programs/functions and discrete applications were prepared in a matrix for the task to be outlined and agendas and events scheduled. Because of the needs for management information and for instructional CAI, a two-pronged approach continued throughout this first year (1983): instructional applications and installation of a management data base.

Planning Initiatives.

The purpose of these major initiatives in early 1983 was to assist the Massachusetts Department of Education, and the Adult Learning Centers, in designing a comprehensive planning process for interactive technologies. This planning focused on implementing and documenting the objectives and activities that evolved from the six learning centers that were implementing technology. Improving participation in the delivery of adult learning and adult literacy, programs and services, is the ultimate aim with the utilization of technology as an imperative for today's information society.

These activities resulted in several tasks that were planned and undertaken to support the development of this comprehensive approach. Several of these tasks are outlined here:

Task 1. Prepare agendas for the meetings, conferences and planning activities for the six project sites meeting with the SEA and resource staff from the MEC. At each site, the Directors nominated individuals who would have commitment to these tasks and who would be part of the planning group to develop trainer resources. Steps initially resulted in:

(a) identifying teachers who were part of the initial planning and development effort with the MDE.

(b) inviting colleagues and other resource persons to meet with the planning group

(e) providing access to both hardware and software for preliminary preview and examination

(f) conducting meetings, events and other activities on utilizing microcomputers and their applications.

Several additional tasks were set for this project and the activities and endeavors carried out by MEC staff:

Task 2. Prepare syllabus on training sessions conducted to be offered as part of the ongoing project and program work

(a) conducting a microcomputer training seminar

(b) conducting a software leadership institute

Task 3. Submit a proposed model or framework that relates these activities against a conceptual framework.

Task 4. Identify the constraints and the needed solutions, concerns and issues that arise together with the accomplishments.

Task 5. Submit a set of recommendations and next steps for the 1984 and 1985 fiscal year and the planning required.

This effort is detailed in a section of this report to identify those requirements and recommendations for sustaining and improving the existing initiatives. This will also have impact on the network expansion and replication into new sites.

Task 6. Complete the literature and review of activities with references and resources. This task is submitted in the bibliography that accompanies this final report.

Major Issues Addressed by these Initiatives

In general, the project provides leadership training and intensive staff training for instructional and administrative uses of microcomputers. This effort is intended to substantially expand the present computer instrutional capability through the purchase and installation of equipment and software and the creation of a cadre of trained staff. The lease-purchase of Apple II-e microcomputers and the installation of IBM/XT for administrative purposes is designed to improve record keeping and follow-on with clients at the learning centers as they achieve instructional goals. The project would thus improve the instruction provided to lower functioning adult students through the use of appropriate software for adult basic education or GED requirements, primarily through supplementary computer assisted instruction. Nearly all clients enter the programs scoring below the eighth grade level with a few who are working on GED. By improving the CAI components, it is expected that the learning centers will be better able to meet these identified client needs.

As evidenced by the background statements and the extensive bibliography, computer access and utilization is no small undertaking. These issues are of major importance and concern to the State planners at this time. Issues addressed included:

- utilizing technology for instruction and program management separated into a two-pronged initiative
- training requirements and inservice agendas prepared
- access and installation of computer hardware
- computerization of ABE statistical and financial reporting
- identifying resources, software and other components

Inservice for Adult Educators

A full training course was offered by the Merrimack Education Center for these six sites and other interested participants. The content of this training program followed this general outline with planned agendas for each session:

- Getting Started with Computer Operations

This segment of the course pertains to computer systems and their operation. Such topics as basic components of a computer system, fundamental operational techniques, peripherals and maintenance of computers are reviewed. Instructional computing, how to operate the computer, understanding the keyboard and function keys, using a diskette, creating a data diskette, assembly and disassembly of the parts of the computer system.

- Understanding Computers and Software Materials

Names and characteristics of different brands of hardware; peripherals avaiable; diskette care; types of software programs; use of the system master diskette and system commands

- Instructional Applications

Classifying and evaluating software; exploring software resources and software tool programs; data bases and their educational uses; word processing demonstration and application.

- Planning Lessons Using Computers

Using computers for instructional purposes such as drill and practice; using software applications of computers ; samples of graphics and data bases. Educational applications of microcomputers were reviewed in three categories: (1) CAI; (2) Information processing; and, (3) computer-managed instruction.

- The Basic Ideas of Programming

Introductory programming terminology; concepts of a computer language;

- Institute--Evaluating and Selecting Software

A five part series concentrated on the review and evaluation of software for instructional and technical quality.

Software terminology, criteria for selecting materials, evaluation of representative software packages, and sources of software information (EPIE reviews, Courseware Reviews, etc.)

Staff identified from the learning centers were provided with a five-day intensive institute on software evaluation. The institute was open to participants selected from across the State. This leadership institute trained a group of Massachusetts adult educators working with basic education students in software evaluation identification, evaluation and applications.

Appendix B is an outline of the Software Evaluation Institute sessions. Some of these topics were also featured in the introductory awareness sessions as well. The training consisted of a variety of presentations, software demonstrations, and "hands-on" activities in which participants interacted with software on a variety of microcomputer equipment configurations at the MEC site. Institute leaders, George Hanify and Robert Milley, guided staff through the initial awareness sessions to more advanced training on technical and instructional design features of educational software. Other MEC consultants and specialists worked with the group in areas such as computer managed instruction (CMI), word processing, software tools, and on-line data base searching. One full day of the Institute was dedicated to the evaluation process and constructing the software review checklist using samples of software screened as potentially appropriate for use with adult basic education students. Participants were then able to develop their own criteria for assessing the quality of software as it relates to the needs of the adult learner. The collaborative product for the groups' effort is the Evaluation Form for Adult Education Software (cf. Appendix C).

The established criteria were applied to the collection of software available for review at MEC and software that individual sites had purchased. Participants examined many programs and made some recommendations for purchase at each site. Expectedly, some software identified as especially appropriate for some sites was, because of the variance in adult client populations, not rated as being useful to other sites with different clients.

Self-guided materials were used before the morning agendas and this was greatly facilitated by the rich and varied software materials collection at the MEC site in Chelmsford.Materials development agendas and competencies were coordinated by MEC. The Software Leadership Institute in particular encouraged the teacher trainers from the adult literacy centers to try out their own inventiveness through "adaptation" and modification under the guidance of the instructors. Clearly, an important concept in the impact of this Software Evaluation Institute is the development of a cadre of staff who then can serve as a software

resource group for planning conference agendas and to provide leadership in developing an information base of evaluative reviews of software products. The trained staff now have expertise with software appropriate for adult learning centers and its application. This capacity at the individual sites is viewed as a great benefit to clients as well as other faculty at the site.

The trained staff have now had experience with the software and its use and are able to take this new capability to their clients at individual sites. A committee of trained staff volunteered to continue meeting to share and exchange their software reviews and make them available to a wider audience. A number of evaluations were written and four individuals made a formal presentation of the group's accomplishments, findings and future plans at the annual Worcester Conference. Several of these staff also volunteered to lend their expertise to the Connecticut adult education centers for conducting their inservice summer workshops.

A staircase or step model for identifying and selecting software programs was used in this software evaluation process. (Cf. Figure 1; D. Guelette and others) Finding and Reviewing Software. Also, copies of the NEREX Guide to Guides for software review and the Merrimack Education Center's CAPS Guidebook were distributed to participants. The section "Selective Courseware for Adult Educational Programming," from the Pennsylvania Adult Education Project, ABE Shenandoah Valley District, was distributed for participants to consider in reviewing ABE/GED software.

The chapter on Language Arts software from the D. Guellette book was used for discussion in the software institute by participants.

The listing of software from the PDE 1983 publication was made available to all participants.
A survey of the participants in the Adult Education Software Institute was conducted using a questionnaire instrument.

(See Appendix D.)

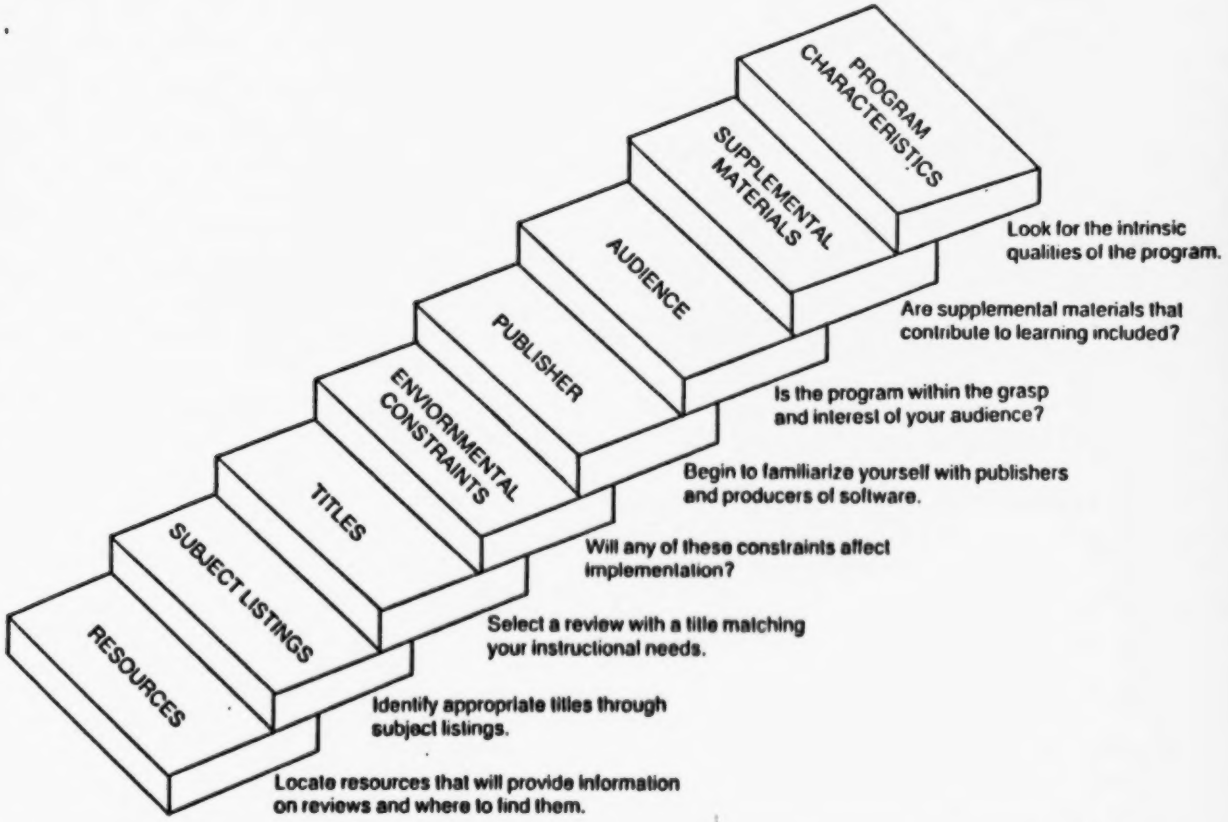
PROGRAM CHARACTERISTICS
SUPPLEMENTAL MATERIALS
AUDIENCE
PUBLISHER
ENVIORNMENTAL CONSTRAINTS
TITLES
SUBJECT LISTINGS
RESOURCES
Look for the intrinsic qualities of the program.
Are supplemental materials that contribute to learning included?
Is the program within the grasp and interest of your audience?
Begin to familiarize yourself with publishers and producers of software.
Will any of these constraints affect implementation?
Select a review with a title matching your instructional needs.
Identify appropriate titles through subject listings.
Locate resources that will provide information on reviews and where to find them.

Figure 1. Finding and Analyzing Reviews and Product Abstracts for Software Suitability. (To identify suitable instructional materials through reviews and product abstracts all of these steps should be considered and followed.)

Gueulette and others, 1983

Planning Implementation-- Adult Learning Centers

Several of the tasks identified at the outset of the project contributed to site implementation and applications at the Adult Learning Centers identified for this project:

a. identification of persons and those who could develop teacher trainer skills with microcomputers

b. development of a resource team of staff members from learning sites across the State

c. development of local site resources for microcomputer inservice and courses or programs.

d. identification, selection and acquision of software and supporting manuals/documentation

e. teaching teachers to become trainers or a cadre of leaders who will initiate applications of microcomputers in demonstration activites while training other staff members.

A discussion of considerations related to goals, hardware and software, as well as instructional purpose emerged from the Institute and a computer exchange and support network grew from these initial efforts.

Implementation at Sites

Adult literacy teachers are presently confronting the need to develop computer literacy and to devise strategies for integrating computers into the adult literacy program. Few other recent topics have generated such widespread enthusiasm and interest in inservice training. The State Department early on recognized a need for these strategies for providing training and support with a mission of devising a training initiative that is useful to teachers and administrators. The leadership of the State Department resulted in a collaborative approach to maximize the human and materials resurces available for training and support activites.

To review the site implementation, two factors need to be considered: variety of activities and extent of use. Diversity of client groups and diversity of objectives feed into these factors as they are translated into the operations at each site. To carry out any implementation, the staff need to see perceived benefits and responsiveness to client groups. The technological trends described earlier reflect those forces regarding the level of need or concern for change and the emergence of leadership personnel who are willing to undertake the enormous amount of work necessary to implement computer technologies. Furthermore, these leaders were asked to introduce a new idea or conception of instruction and convince their administrators of the need for availability of new financial resources. This energy provided by dynamic leadership has brought resources to bear and begun to bring activities to life.

Participation in the utilization of microcomputers was voluntary and utilization by these volunteers of their new knowledge and training experience leads to a first level of outcomes or stage one (levels of concern). Incentives, rewards and benefits were made available to initiate this investment of time and energy. In all cases, agreements have been made to continue the arrangement and exchange into another school year. This extension depends on the State's commitment and a continuing sense that client population needs are being met. Long-term improvement will depend upon the chosen activities, the resources available and the administrative commitment at each site.

Further development requires aggressive leadership from the State and articulation in a State plan of what the arrangements could be and could achieve. This first year of successful linkage has only begun to examine new development needs. More complex and systematic changes in response to technology trends will build on these prior activities and relationships already established. Knowledge transfer through courses, workshops, Institutes, and resource exchange, such as those envisioned for the software and outreach to sites, will increase in geometric progression.

The initiative from this project enabled staff to set up teacher-to-teacher exchanges. A strong belief in the importance of "craft" knowlege (about settings, about clients, about curriculum) emerged out of experiences of these trainers as they implement these software materials.

It is likely that several factors will need to be addressed to accomplish long-term refinement and routinization of this creative investment of energy:

1. Sustained support from the local community administration (in terms of financial support and encouragement)

2. Continue support from the State

3. A continuing and varied program of activities through the exchange among sites and with resource people

4. Continuing strong leadership

Wide and substantial benefits can be derived from the State's increasing support of such arrangements, especially for participating staff and clients at each site. The costs of these activities are relatively modest in proportion to the benefits accrued to client populations . Indeed, these activities have been built on mutual advantage for staff (new and refreshed outlook) and for clients (motivational forces with skills as a by-product).

Activities for Software Exploration

Problems experienced in acquiring quality courseware for adults at the remedial instructional levels (e.g., "grades 2, 3, 4, in reading level) have been cited. Much of the courseware seems directed at the college-bound high school student in mathematics with relatively little of a remedial nature being available. The ESL market, a "thin-market", is also widely under-represented as we review software. Programs designed to assess the client's potential for passing the High School Equivalency Examination (not SAT) will need to come on the market. Worcester has located two or three of these programs that they are currently reviewing.

A survey of current microcomputer programs and software identified only a few programs that, in terms of content and format, seemed specifically suited for adults. Although some are intended for school-aged children, they do apply in specific instances to adult clients and can be meaningfully used in an adult setting. An example, Teasers by Tobbs, has a motivating format, is attractive, amusing and also provides a valuable instructional sequence for all ages. Educational content and technical design are superior and planned to appeal to the "mind" and thinking skills. Some other formats, designed to mimic arcade games such as Hangman, Blast-off, or Tank Attack, generally do not appeal to the ABE client or older adult because they are contrived or "cute"/tacky."

A few of the features of the technology that make it especially attractive are its motivational appeal, its branching capability, and the ability to provide immediate feedback. The pace of learning can be increased through this rapidity and teachers can individualize instruction. These applications of microcomputers were reviewed by the planning group at meetings and through the various planned agendas for the Institute offered by MEC.

It is difficult to construct a comprehensive program based on gaming activities that will have wide appeal. One Random House program was reviewed by a participant at the corrections department with clients and found to be highly motivating and instructional (Shifty Sam). While these formats may hold the attention of young students, they may embarrass or insult adults. Graphics and animated figures, as Disney has surely told us, can have universal appeal of a classical nature, however; some may be in-appropriate for adults.

Milliken Math Sequences is a collection that has met with general group approval because of its wide curriculum scope and simple-to-use management system. Some programs that utilize the Cloze procedure for teaching reading were judged as beneficial, particularly Missing Links (Sunburst) in which the teacher may enter adult-appropriate text. Various "shell" programs, those in which the framework and format are built in but also permit the teacher to vary the context and/or ability levels, were deemed useful. Among these, MECC (MINNESOTA EDUCATIONAL COMPUTING CONSORTIUM) Spelling is a fine example. Context sentences and spelling choices may be drawn from a large file or may be totally teacher supplied. Test Generator (Minnesota MECC) is a useful program that produces worksheets or screen exercises that are teacher designed.

Identified curriculum resources and software packages include manuals, guides, handbooks, program descriptions and other practice-type materials. Thus the state-wide sharing and networking efforts have begun to identify an exchange of information about software developments. The effectiveness of sites can be improved if this network is encouraged to share progress, share information and tap into resources available in collections in the State. This networking can (a) improve the identification process so that more resources are identified; (b) locate the resources in a collection for exchange; and, (c) develop a support group for technical assistance combined with the latest information technologies for accessing software.

All sites were engaged in what might be called "practice improvement" using technology as a tool. In one instance, a software program was modified to contain appropriate vocabulary for the nature of the GED examination and relevant vocabulary for the Worcester clients. Project site staff are cognizant about skills demanded by their clients. Furthermore, the incentive and "seed money" provided for faculty development, hardware acqusition and software was a very valuable resource.

Several meetings and a training institute were held to evalute current commerically produced educational programs available for microcomputers that would be appropriate for adult learners. Major producers of education materials Random House, Milliken and the like, have left software at the Merrimack Center for preview and demonstration purposes and these items were used in the classes. As microcomputers became available at the respective sites, there was a natural void in respect to software availability which was gradually overcome by purchases and evaluations of software at the Training Institute. There are approximatey 200 independent producers of software; of course, the quality of the courseware varies significantly among these publishers. Companies such as Milliken directed their efforts at developing courseware series , including a management portion, requiring expanded memory in the computer. The SONY, using an 8" disk also was designed to compensate for the lack of memory and storage in the other microcomputers. Most early programs were designed to run exclusively on the Apple computer and the Apple has been extensively used in schools in Massachusetts. Additionally, the IBM XT was examined for administrative data purposes and two of these units were installed, in Worcester and New Bedford.

The Institutes evaluating software were among the most popular from major producers, including Minnesota MECC, and therefore the most likely to be found in school districts. The survey of courseware providee at the Institte sought to assess computer programs that were frequently cited in journal reviews and many have on-line reviews through major evaluative systems such as the Northwest Lab for R&D.

Courseware Selection for Adult Education Classes.

Caldwell(1979) reported that "initial performance data from eight projects in adult education centers indicated that learners gained on the average one entire year in reading after less than 12 hours of instruction with CAI and that the dropout rate was only five percent. Significant gains were also reported by Lindsay (1981) for students using CAI over and above the control group on a usage subtest in language. Ruth Nickse states that the "principal advantage to adult education students is the possibility of te immediacy of application of computer skills on a job in data or word processing. When microcomputers are used to teach basic skills, the operational techniques absorbed as a by-product of instruction become in themselves, marketable skills."

Computer Assisted Instruction such as PLATO, TICCIT or CAI CCC have proven that computers can provide useful and timely instruction for the adult education students-- a group that will comprise a large segment of the educational population in the future. (National Conference on Computer Based Education, Bloomington, Indiana, 1980). However, Coburn (1982) stated that "teachers could not use materials and equipment and few teachers have sufficient training in this area. Data indicate that preparation of teachers to use computers has been neglected. This lack of adequate teacher preparation for CAI is still a concern that must be addressed if the State is to effectively utilize the hardware and software that schools or adult sites are purchasing. Some efforts in other states have been made to use microcomputers for remedial adult learners. Pennsylvania Department of Education, Division of Adult Education, has provided funds and publications for an extensive survey of computer software in order to determine the appropriateness and availability of programs for adult learners.

Programs to offer life-skill competencies have just now been selected for preview and review. The SUPPES survival skills, available only on mini-computer, appears to be adequate and perhaps, as others have done, this program will be replicated for the (SONY) microcomputer in the near future. (See evaluation report from Long Island and for ESL from MEC).

Initial experiences with software and one computer has been positive at each client site. Student reaction is enthusiastic and well-motivated according to faculty reports. Group concensus on software for purchase can be reached through the evaluation process so that more software can be identified and screened for relevancy and appropriateness using the evaluation form. Demonstration and review copies of software should be housed at a location where outreach is possible to diverse member and client groups. Arrangements for access of this software need to be worked out so that staff from different centers can preview software and read the accompanying evaluations before purchase. The software evaluations state what specific skills the software will address with the particular and diverse client groups.

Three of the team members were chosen to present a workshop at the Adult Education Conference and describe efforts to date in Spring, 1984. By agreeing to participate in these planning and development activities, the individuals committed themselves to further development of their knowledge and skils by preparing to teach others. The success of this team activity was important because it attracted the attention of other faculties and was a way to check out the validity of the software identification and review process.

Up-to-date equipment is a key element in providing quality for upgrading and retraining staff. Our training programs for clients lag behind industry in using equipment available for training. Matching equipment used in instruction as closely as possible to equipment used in actual work is crucial, because the closer the training experiences are to actual work situations the greater is the transfer of learning and the development of competencies on the job. For this reason, word processing emerged as a very high need. From experience at the learning centers, we can concur with Ruth Nickse when she identified the motivational aspects of microcomputers: "A principal advantage accrues to adult students in the possibility of the immediacy of application of computer skills on a job in data or word processing. When microcomputers are used to teach basic skills, the operational techniques absorbed as a by-product of instruction become in themselves, marketable skills." In his experience with adult clients Ken Tamarkin has supported this need for word processing and for data base or spreadsheet types of software.

Problems obtaining equipment needed to keep their technology resources up to date were identified at all sites. Technology is changing so rapidly that training programs easily can fall behind.

Examiniation of the adult learning center offerings will need to keep in mind overall skill needs of their clients for competitive employment. These programs will rquire anmnual upgrading in regard to course content, instructional mterials, or equipment.

Most training with which graduates will be able to become productive immediately in new or upgraded jobs, will represent significant changes in a wide variety of technological breakthroughs and applications over the next ten to fifteen years. In microcomputer developments, new hardware may become obsolete in the few months between the time it is put on the market and people are competently trained to use it.

Activities for Administrative Data Base

The purchase of state-of the art equipment for the data base was seen as an essential task. The technology initiative was designed to:

(a) develop an information base for use by ABE sites and technical training sites;

(b) identify barriers or constraints to implementing the IBM/XT data base using Power Base software

(c) describe how these training methods could assist in the implementation of a data base for on-site record keeping

(d) disseminate the results of this training and implementation as it occurs in each of two sites with the IBM/XT equipment

The scope of this implementation was defined in terms of priority issues and concerns for meeting State reporting requirements. The selection of Power Base considered the utility and needed kinds of information that would be helpful to sites initiating technology aaplications; and, the practicality within the resources of the project to provide the necessary training, technical assistance and support services.

Data base management systems on microcomputers can easily store and call up many reords of information very quickly. Just how quickly is a function of the specific computer configuration and the data base program used. An APPLE II for example, running dBASE will manipulate a file containing 65,535 records within a few moments. Experience with the design of a health data base in 1982 had provided knowledge and expertise about the construction of these types of files. Newer 16 bit microcomputers, such as the IBM/XT, are able to do the job faster. Also, a wide and diverse pool of successfuly proven software was reviewed for 8 bit machines and for 16 bit microcomputers before a selection of POWER BASE was made.

In addition to registration management and attendance record keeping, microcomputers at the adult learning centers are able to assist in other management tasks:

1. tracking financial information, supplies, books, materials. Automating these records for audit and for management purposes.

2. GED graduate record keeping. Computerizing this procedure would provide the ability to keep track of students once they leave the Center.

3. Inventory control

4. Resource Sharing. There is a potential to use micros at large Centers for managing registration documents for smaller outlying Centers. If an affiliate center cannot use a microcomputer, it may be possible to send data to the larger Centers for processing. Results for the State reporting requirements could be processed in a centralized fashion with results sent to each local site as well as the State.

5. Information Sharing. It is currrently possible technically, to link geographically dispersed microcomputers to a central location for the purpose of sharing information. This type of network could possibly eliminate the State reporting requirements in paper format if the information at each Center could be sent through electronic mail. Just whose responsibility it is to enter and maintain the files could be worked out so that the State or the local center could have access to up-to-date information of a planning nature.

Implications

This State initiative was made possible because State funding covered the start-up costs. With continuing stages and refinement for operations, additional costs will be incurred. The level of outcomes is expected to be proportional to the investment. Long-term support issues have been raised at meetings and need to be addressed in some way directly by those who provided the start-up funding. Local sites are reluctant to invest heavily in these new priorities when they see themselves primarily as service providers to their clients.

Leadership has emerged in the group and this leadership can sustain the exchange through development. The time available for this effort is not completely appreciated by administrative .....(1 site)

Further documentation of this exchange mechanism is desirable and probably would not exist without state assistance. Arrangements of the type initiated in this state-funhded effort should be examined in light of federal dissemintion efforts such as the National Diffusion Network to mutual advantage.

The state policy provides a structure for what now exists and support of this collaborative working arrangement among sites is cost-effective. Linkage to resource sites and the colleges works to mutual advantage and for enhancement of the state-wide education system. Local sites will need to look beyond the immediate training needs and "traditional forms of schooling (knowledge-giving) toward the development of problem-solving, curriculum and instructional development (i.e., change) and other desirable changes in the learning process for adults. They should also look to the involvement of key staff from industry who can serve in part-time teaching roles (such as Brockton has done).

Constraints such as "overload" have been identified because of limited staffing at sites. The sites must examine realistically their resources and energy for this new endeavor. Prioritizing and time allocation are key in this avenue. There is a need for practical tools to facilite the inventiveness of the key leaders at each site. Suggested items are (a) directory/index of software available at each site with reviews; (b) implementation guides for those wishing to set up a local microcomputer program; (c) some formative evaluation instruments (such as the one developed in checklist form at Worcester). (d) sharing of expertise with other as yet uninvolved sites with resource personnel from the participating sites in Year One being on-call . This will have impact on the local administrative decisions in regards to funding and substitutes for teachers.

Case study methodology for Year Two should be recommended with some attention to the development of quantifiable outcome measures .

Activity -- The predominant activity at each site was the introduction of computer awareness to a grouping of clients and the awareness for other faculty at the site. Arrangements at all sites were reported to be aimed at a diversity of obejctives which varied with client populations.

This work of Phase One was undertaken in part because of what was seen as the unique role of adult learning centers in society as (a) an equalizer/ equity issues; and (b) as disseminator of knowledge to adults (non-degreed). These activities were examined for their potential as delivering knowledge/skills -- "knowledge transfer" from the resource people to practitioners at the sites to their clients. These selected participants then became linkers to sources outside their local area in sharing with other staff members from around the State.

In an attempt to enhance an enriched learning environment, the instructors accumulated a collection of materials (software and materials formats) which became a resource bank at each site. This resource bank was gradually used by clients enrolled in one or several programs at the

site. The staff leaders emerged as "resource finders" for their own site and as "process helpers" or facilitators for those trying to change their instructional practices to incorporate microcomputers. Gradually, other faculty members will be integrated into the site activities, thereby multiplying the contacts with area site staff.

An initial group of eighteen adult educators attended a three-day computer literacy program at the MEC Lighthouse and also outlined statewide program plans in the area of technology. The results of these initial imeetings and the three-day computer literacy program have led to a statewide effort for the first year in five major areas:

1. Design and operation of computer literacy programs for adult educators.

2. Design and operation of a software leadership institute for training trainers.

3. Lease/purchase of computer hardware for instructional purposes in six adult training sites.

4. Design and implementation of an administrative database in two sites for computerizing registration and attendance procedures along with demographic data on clients .

5. Documentation and dissemination of the technology programs and practices in this report.

These organizations now have a full year of experience in initiating service for their client populations with technology activities. They also have broadened their experience in working with local sites to upgrade or retrain adults for job-related or personal goals, for GED and the like. These sites utilize various delivery systems and modes of instruction for their training activities. These differences highlight the use of technology and implementation with different client populations.

The State has been successful in stimulating innovation, inventiveness and encouraging technology activities appropriate to each locale. Training these human resources (staff at each site) is considered the "prime management tool" to create an up-to-date, skilled cadre essential for a technology-oriented society. State and federal policy initiatives have placed more emphasis on basic education for young adults (JPTA, the employment wage for summer jobs for youth, etc.) and training for adults oriented toward high-technology industries.
A major role for Adult Basic Education in Massachusetts is aiding in technology transfer through up-to-date training opportunities for adults as well as adult literacy training with an emphasis on computer literacy for societal functioning.

Community colleges have begun to develop new programs that include concentration in robotics, word processing, laser/optics, medical electronics, hazardous waste control, and so forth. Another major area for ABE outreach is in the counseling, placement and work (job-skills) for employment or for encouraging clients to increase their employability by enrolling in these community college programs. (See for example, Retraining and &pgrading Workers: A Guide for Postsecondary Educators. National Center for Research in Vocational Education.)

RECOMMENDATIONS

As the program moves into Phase III within Massachusetts, it is important to outline some of the areas of need relative to future endeavors in the application of computer technologies. This listing may or may not be unique to the field of Adult Education and, in most cases, can be applicable to all institutions as they strive for the best integration of technology within the curriculum. The following listing of recommendations was developed from a series of meetings with SEA personnel, local site implementors and attendees and participants from various programs operating across the State. The purpose of this set of recommendations is to provide materials for future planning, for agendas, for discussion and future projects by adult educators and resource personnel who are studying and exploring ways in which to optimize the use of technology within their educational and training settings.

1. The availability of computer hardware within the adult education field continues to be sparse and new resources will be required to improve equity and accessibility. Currently there are some seventy or more Adult Education programs operating in Massachusetts that could benefit from the use of computers in their operating instructional and/or administrative operations.

> **Recommendation:** Resources for increasing the availability ofcomputers should be studied through the regular budget processand also through corporate gift programs, foundations, federal grants and other alternative sources of funding.

2. Although available software is beginning to improve in the GED and ABE sectors, English as a Second Language (ESL) remains a "thin-market" category. SAT software is beginning to grow in quantity and perhaps GED will follow that path. There continues to be a critical shortage of quality software. Software development, although much in need, may be a costly alternative for public institutions to undertake.

The software exchange mechanisms, where software can be evaluated and "modified" may be a viable alternative.

> **Recommendation:** The current software institute participants should be utilized to evaluate and make recommendations in the identification of quality software for adult education programs. These participants should be utilized as consultants in establishing a software bank as part of a distribution center.

3. Limited budgets in Adult Education programs also impede the development and availability of adequate amounts of software. Stretching a thin budget to provide the necessary software materials has been cited again and again as a major problem. Quantity purchasing of software with appropriate discounts requires new organizational mechanisms. The pooling of limited dollars for more cost efficiency is one possible way to aggregate the market and to provide more leverage with software producers and distribution agencies.

> **Recommendation:** A software distribution center should be established for adult education software. The center should develop agreements that would promote discounts on the purchase and distribution of software. The center should develop a plan to also conduct awareness sessions through the Massachusetts Department of Education Regional Centers in close proximity to adult education programs across the State.

4. Training of individuals in software selection and evaluation is not feasible when only small amounts of software may be purchased. Use of this expertise for a state-wide resource exchange would be more beneficial.

> **Recommendation:** The software consortium of participants currently formed should be expanded to include new participants. A second software instituion should be scheduled in the 1984-1985 year for sixteen to eighteen participants.

5. The location of small community-based adult education programs across the State suggests networksing arrangements to optimize the use of administrative and instructional software.

Recommendation: One or two of the urban adult basic education sites could begin exploring with surrounding communities possible networking arrangements relating to administrative and/or instructional applications.

6. Research projects are needed in the application of computer technology within Adult Education programs.

Recommendations:

a. The application of CAI programs with adult learners. Because of the track record of Suppes CAI software (ComputerCurriculum Corporation) and the PLATO software (Control Data), these major programs should be investigated for the urban sites and pilot programs initiated.

b. The integration of technology with the curriculum of the adult literacy program. This should be reviewed by the software consortium which is made up of participants who have completed the software institute conducted in 1983-1984. A published listing of curriculum objectives from each center site would help to identify the essential skills for the ABE and GED curriculum where software can be selected for review.

c. The use of authoring systems in the development of adultliteracy software programs. The use of PILOT, BLOCKS or other simple teacher utilities and authoring systems should be the next phase of training offered to the site staffs to develop a leadership cadre. The time for staff to attend this training should be reinforced and supported by the local administration. Also, the marginal role of the part-time staff can be examined within a local district so that the assignment of individuals can match the proportions of the task to be completed.

7. Three to five-year plans for the use of computer technology with adult literacy programs are needed at each site. This could begin in such local districts as Brockton where the elementary/secondary program is already developing a three-year plan. The addition of adult literacy obectives, and an examination of ways to use staff effectively, would greatly assist in coordinating this plan.

> **Recommendation:** Adult education sites should be provided assistance in the development of a three-year computer application plan for their respective sites. These plans should include current assessment and inventories with projected requirements. These planning efforts would be of invaluable assistance at the State level for developing new statewide initiatives.

8. A computer concept program for adult learners at each site should be a basic requirement for all participating clients. A suggestion for this program would be a recently developed computer concept programs that would include keyboard skills and tool programs on word processing and databases. All adult education staff should hve the opportunity to participate in computer literacy programs as part of their inservice education.

> **Recommendation:** A 15-hour program on computer concepts,which is operational on Apple and IBM microcomputers, should be field tested in adult education sites with both instructors and participants. An outline of this program is listed in the Appendix and has as its focus keyboarding skills, data storage and retrieval, text processing and tool programs.

9. Information currently available on use of computers in technology and available software should be disseminated to educators across the State through the medium of conferences, newsletters, and catalogs. Awareness sessions on the applications of technology in adult literacy programs should be offered through the six regional centers of the Department of Education as appropriate.

In order to complete these specific goals, we are suggesting here some functional requirements that the support structures and functions might be in place to carry out the recommendations.

> Recommendation: A statewide conference on the topic computer applications in adult literacy programs should be planned for the 1984-1985 year. At this conference successful programs, plans and software reviews should be shared for general dissemination. Information should also be shared through newsletters, mailings and other organizations such as the Massachusetts Association of School Superintendents.

10. The State Department of Education is completing the installation and use of microcomputers at the Central and Regional offices. The potential for networking in a number of reporting areas becomes feasible with the increased availability of microcomputers in the field.

> Recommendation: It is suggested that the current state reporting forms be reviewed with the communities of Worcester and New Bedford for possible networking. Additional kinds of data currently being processed in the centers and manually collected should be explored for possible computer application.

Functional Requirements -- State Planning for Microcomputer Use

We envision several steps that have begun and that will need to be continued into Phase II.

1. Resource availablitye. Combining resources from the diverse sites will surpass the capabilities of any one site to provide services for economic development.:

trainers
equipment and peripherals
instructional

. The need exists for availability of a statewide resources that will function as a major point for the collection and dissemination of information about all aspects of technology including hardware developments, teacher and administrator training, software evaluation, and implementation strategies.

This exchange should encourage the use of microcomputers and other interactive technologies (videodisc, etc.) in their educational programs. The dissemination of information and research on current uses of computers is essential and this type of exchange can promote the use of new technologies as a tool for learning.

2. Identify faculty and leaders (gatekeepers) who will be responsible for microcomputer utilization at each site (both instructional and administrative).

link with outside resources
link among the sites
outreach to new clients
identify additional faculty with expertise
arrangement for facility/equipment usage to
    get the maximum client impact
monitor your services
expand as appropriate

A major role for this identified cadre of personnel is to demonstrate software review and evaluation process as a part of staff development. All participants in the seminars and Institute judged this software review to be an excellent component of their staff development process during the project year. As with other instructional materials, this selection of appropriate software and courseware is one of their most important responsibilities for the teaching role.

3. Identify Internal Mechanisms and Procedures

trained proctors -- aide
instructors who know the practical applications in industry
equipment repair
curriculum development priorities
policies regarding costing of programs and services

A local staff development and program development process will plan for use of technologies as appropriate to client needs. Software and courseware selection, using the software review practices printed in the forms in the Appendix, use accepted standards and procedures. Software is reviewed on instructional and technical quality on separate scales. It was deemed important that these separate and individual ratings, on a scale using a point system, be maintained for each software program reviewed and kept on file for perusal by future reviewers.

4. Identify Alternatives as Constraints Arise

goals and mission -- set priorities
identify prerequisite learnings in related skills areasmake available
qualified instructors
schedule time for maximum utility (hours, days, months)

The network and the meetings, led by Chairperson Linda Braun, have made an excellent start in this direction. At each meeting, Linda raises the current issues along with short-term planning and long-term planning goals.

5. Establish a marketing plan at each site. A work force trained in technologies will prove to be a valuable economic resource for the local community. It is important that this "outreach" continue to develop interests on the part of business/industry and individuals from busi ss/industry to foster and encourage the ABE and job-training environment locally.

awareness among all faculty
public information
communication of "success stories"
monitoring of "graduates" and employment progress; evaluation of performance in terms of performance on specific job tasks

It is essential that the sites build a strong data base on follow through and placement of their graduates. Working with industry in this direction would seem to be a viable way to establish further "credibility" for graduates.

Job Development

Local companies do not have resources for writing curriculum, monitoring and evaluating the training and assuring transfer of training to practical applications. This is an important role for adult learning centers to fill locally. Local industry may have resources they can con-tribute to this need, including facilities, up-to-date equipment, and potential instructors for evening classes, which might be tapped through coordinating efforts with the adult learning sites. ABE instructors can serve a vital role for those local companies that are unfamiliar with goals such as "competency based" , "career counseling" and other vital functions of each site.

To get any long-term impact, the sites will need to consider the extent and number of long term collaborations both with each other, among sites, and locally with business and industry. In particular, instructors who demonstrate cognizance and practical applications in industry are being used part-time and this would hopefully increase.

Summary

During Phase I (1983-1984) the introduction of computer technology in adult education programs has been initiated in selected ABE sites across the Commonwealth. These effortshave been designed to build a capability at the local level in both instructional and administrative levels.

Personnel from ech of these sites have been been provided computer hardware (APPLE IIe), instructional software and basic training in computer concepts (literacy). More extensive training has also been provided selected site personel and key personnel across the State in a specially designed software institute.

Two sittes, (Worcester and New Bedford) have been provided technical assistance in the developmentt of a data base package in attendance and enrollment for use on the IBM PC computer. This is currently being tested at each of the sites. This capacity can be summarized as follows:

1. Adult education staff at the State and local levels have been trained as trainers in two major areas (a) computer literacy, and (b) software evaluation.

2. Adult education program sites are utilizing microcomputers in the two areas of (a) instruction and (b) administrative.

3. Adult education software institute graduates have been identified as consultants in the area of softare selection and evaluation.

4. An adult education administratgive software package has been developed for the microcomputer.

5. Syllabi and evaluation instruments have been developed and documented i the various training programs.

The success from these initial endeavors in the use of microcomputers in adult literacy programs will be fully realized as sites gain additional on-site experience and are provided the opportunity to share these activities with adult educators from other sites. In essence, a beginning network has been established and is ready for expansion. Additional computer hardware and software is needed across the State and remains a priority for the next phase of activities. Recommendations outlined in this report provide guidelines for the continuation of activities to integrate use of computer technology with adult literacy programs.

Appendix A

ADULT EDUCATION INSTITUTE

(Review of Activities)

Appendix A

ADULT EDUCATION INSTITUTE

Review of Activities

Session 1:

A.M. Introduction - review 5-day agenda
Roundtable - discuss individuals' involvement, express needs
Break into small groups--work out goals

P.M. Software Overview - Henry Olds
Wrap up - give assignment
a. bring in a piece of "good software"
b. identify an area that you would like software to address
c. readings

Session 2:

A.M. Hammetts
Software classification
Demo - Hands on

P.M. Gail Ewer - State's Expectancies for Institute
Tool software--word processing demo
Explore evaluation forms.

Session 3:

A.M. Software Management Systems
- Milliken Math/Reading
Shells - MECC Utilities

P.M. Authoring Systems - Unicom
Language Arts Software - types, hands on

Session 4:

A.M. On-line data base search (Sue Bjorner)

P.M. Software Presentation (Harold Davis)
Disk Utilities - initializing, making backups

Session 5:

A.M. Developing the Evaluation Instrument

P.M. Gail Ewer, Dr. Lavin - Next Steps

Appendix B

SOFTWARE LEADERSHIP INSTITUTE FOR ADULT EDUCATION SPECIALISTS

Session Topics -

MERRIMACK EDUCATION CENTER

SOFTWARE LEADERSHIP INSTITUTE FOR ADULT EDUCATION SPECIALISTS

Topical Outline: Software Leadership Institute

Session 1
Nov. 9

Creating a New Learning Environment
- Issues and Concerns
- A Framework for Classifying Instructional Software
- Planning

Session 2
Nov. 22

Criteria for Selection and Evaluation of Software
- Software Resources
- Criteria of Selection
- Purchasing Software
- EPIE Courseware Reviews

Session 3
Dec. 7

Applications Programs: Instructional Tools--How do you apply Software?
- "Good Software": Pushing the Limits of Hardware Capabilities
- Computer as a "Tool" and Its Impact on Curriculum
- Choosing the Appropriate Tool
- Preparing Teachers to Use "Tools"

Session 4
Jan. 11

Designing Instructional Systems
- Alternatives to Existing Software
- Authoring Systems
- Starting to Piece Things Together
- Planning for the Future

Session 5
Jan. 25

Implementation Strategies
- Teacher Training
- Program Design
- Make the Best Use of Limited Resources
- Planning and Evaluation

Appendix C

MASSACHUSETTS ADULT SOFTWARE SPECIALISTS

SOFTWARE EVALUATION FORM

Appendix C

FORM 1

MASSACHUSETTS ADULT SOFTWARE SPECIALISTS

SOFTWARE EVALUATION FORM

PROGRAM TITLE: _____ SOFTWARE PRODUCER: _____

Hardware Requirements: _____

Cost, if known: _____ Includes Back up disk: _____

Estimated Runtime: Per session _____ Total program _____

Replacement Policy: _____ Can be copied: _____

INSTRUCTIONAL PURPOSES AND TECHNIQUES (check all that apply)

Appropriate Uses:

___ABE (0-4); ___Pre-GED (5-8); ___GED (9-12); ___ESL; __Pre-Voc.

Specific Subject/Skill Area _____

___Basic Skill Remediation
___Skill/Knowledge Development
___Enrichment
___Learning Tool
___Administrative/Teacher Tool
___Drill and Practice
___Tutorial
___Game or Simulation
___Diagnostic/Prescriptive
___Other

INSTRUCTIONAL CHARACTERISTICS	Yes	No
Learning objectives are clear and worthwhile for adult learners.	___	___
Typical runtime is commensurate to educational value.	___	___
Tone of address is acceptable for adults.	___	___
Format is challenging, not frustrating.	___	___
Feedback is appropriate, useful, and timely.	___	___
CONTENT CHARACTERISTICS		
Content is error-free and factually correct.	___	___
Difficulty level may be adjusted.	___	___
Presentation is logical and well-organized.	___	___
Vocabulary, concepts, and examples are relevant to adults.	___	___
Content can be changed or added by the instructor.	___	___
Content avoids ethnic, racial, or sexual discrimination and stereotyping.	___	___

TECHNICAL CHARACTERISTICS

Documentation is concise, readable, and adequate.	___	___
Screen directions are concise, readable, and adequate.	___	___
Adult learners can operate program independently.	___	___
Program may be entered and exited with ease.	___	___
Management system required for program utilization.	___	___
A management or record-keeping system is built in or may be applied.	___	___
Program is user friendly and apparently error free.	___	___
Screen and/or text is readable and uncluttered.	___	___
Sound and graphics enhance the program; are not demeaning.	___	___
Rate and sequence of program operation can be controlled.	___	___

PROGRAM QUALITY SUMMARY

4 (high) to 1 (low)

___Instructional Characteristics
___Content Characteristics
___Technical Characteristics

RECOMMENDATIONS

___I highly recommend this program for use with adult learners.
___I would use this program, but with some reservations or changes.
___I would neither use nor recommend this program for adult learners.

Comments: (Strengths, weaknesses, suggested uses, training requirements, requirements, etc.)

_____

_____

_____

Evaluator's
Name: _____ Organization: _____
Position: _____ _____
Date: _____

Evaluator's
Name: _____ Organization: _____
Position: _____ _____
Date: _____

Evaluator's
Name: _____ Organization: _____
Position: _____ _____
Date: _____

Appendix D

PHILADELPHIA DEPT OF EDUCATION

Selective Courseware for Adult Ed. Programming

Appendix D

Philadelphia Dept. of Education

Selective Courseware for Adult Educational Programming

In determining what programs may be most suited for remedial adult learners, we were very fortunate to secure the services of Joy Segall and Jonathan D. Kantrowitz. In addition to their thorough familiarity of computer courseware and expertise in evaluating software, both consultants for this project have been involved in adult education. Specifically, we requested that they select courseware for three general instructional levels: (0-4), (5-8), and (9-12). We posed a hypothetical problem: allowed $1000 for each level what programs would you select? also, if you had access to $2000 what additional programs would you acquire?

After each entry, a page number will be offered allowing reference to the Courseware Survey Section for additional information. Keep-in-mind that although the cost may be given for an Apple disk, the producer may have also designed the program to run on other computer models and on cassette recorders.

An Overview: Instructional Software for Adult Learners

The most startling observation, in connection with our survey, is that we were only able to identify one series of programs which in terms of content and format design seems specifically suited for adults in remedial programs. Nevertheless, at the intermediate grade levels (5-8), there does not seem to be a serious problem in identifying programs which can be adopted for adult programming. A large number of quality courseware, covering all the basic skills, are available at this level. Although intended for school-aged children, the instructional content and technical format are not significantly inconsistent to what might be ideally designed for adult learners.

At the primary level (0-4) there is a serious lack of courseware which can be meaningfully used in an educational setting for adults. Simply, Software at this level has been designed to motivate, attract, amuse, and instruct young children. Educational content and technical design have been planned to appeal to immature minds. Instruction, at this level, is often provided in a gaming format, such as: hangman, blast-off, super car racer, and tank attack. Even for elementary students it is difficult to construct a comprehensive language arts or math program based on gaming activities. While these activities may hold the potential of engaging young students, they are likely to embarrass or insult adults. Graphics and animated figures, which are also pervasive in courseware designed for the early primary levels, are generally inappropriate for adults.

Problems experienced in acquiring quality courseware for adults at the early primary instructional level was anticipated, but more difficult to understand is the lack of suitable courseware at the high school level (9-12). In terms of content materials and instructional format, design features for high school students and adult learners should virtually be compatible. The problem is that most of the courseware seems directed to the college-bound high school student. Relatively little has been developed for remedial programming at the high school level. We are not aware of any program designed to assess a learner's potential for passing the High School Equivalency Examination or designed specifically to assist adults preparing for this test. While there are several programs which purport to offer life-skill competencies, we are unable to recommend any series. We have not found more than five producers who have developed courseware with a Spanish text version. Although the computer, through visual and verbal association, may be ideal for introducing English as a second language; we have not found a single program designed for this purpose.

Courseware development, directed at addressing the needs of educationally disadvantaged adults, has been neglected. Regretfully, this may be reflective of a national disposition to adult education. As a priority, federal and state support for adult education has been low. As a policy, public education has often forgotten their students after graduation. But, as a principle, those involved and dedicated to the needs of adult learners have optimally used available resources in order to provide a quality educational program.

Through careful screening and evaluation of courseware, it should be possible to select a series of programs which, at the very least, would be adequate in utilizing computer assisted instruction for adult learners.

Adult Basic Education (0-4) Instructional Level

$1000 Budget

1.	ALPHABETTA	Merry Bee Apple disk $29.95	(p. 38)
2.	ALPHABETICAL ORDER	Orange Cherry Media Apple disk $34.00	(p. 42)
3.	VOWELS	Hartley Apple disk $93.05 with cassette control device $79.95	(p. 33)
4.	CONSONANTS	Hartley Apple disk $79.95	(p. 33)
5.	COMPREHENSION POWER (Levels A-C)	IC/T Apple disk $425.00	(p. 35)
6.	CLOZE TECHNIQUE	Orange Cherry Media Apple disk $34.00	(p. 42)
7.	COMPU-READ	Edu-Ware Services Apple disk $29.95	(p. 32)
8.	WHOLE NUMBER ARITHMETIC	Educational Micro Systems Apple disk $24.95	(p. 31)
9.	LONG DIVISION	Microcomputer Workshops Apple disk $24.95	(p. 38)
10.	INTRODUCTION TO MATHEMATICS	Educational Activities Apple disk $39.95	(p. 29)

Adult Basic Education (0-4) Instructional Level

$2,000 Budget

1.	SPELLING	Orange Cherry Media Apple disk $34.00	(p. 42)
2.	THE VOWEL TUTORIAL	Hartley Apple disk $120.00	(p. 33)
3.	BASIC READING SKILLS and PRACTICES A-D	Brain Bank Apple disk $240.00	(p. 25)
4.	OUR WEIRD & WACKY WORLD	Educational Activities Apple disk $79.90	(p. 29)
5.	VOCABULARY DOLCH	Hartley Apple disk $39.95	(p. 33)
6.	MULTIPLE SKILLS	Hartley Apple disk $92.95	(p. 33)
7.	WHO, WHAT, WHERE, WHEN, WHY	Hartley Apple disk $35.95	(p. 33)
8.	WORD FAMILIES	Hartley Apple disk $29.95	(p. 33)
9.	ADDITION, SUBTRACTION, MULTIPLICATION	Microcomputer Workshops Apple disk $74.85	(p. 38)
10.	MISSING MATH FACTS	Educational Activities Apple disk $39.95	(p. 29)

Adult Basic Education (4-8) Instructional Level

$1,000 Budget

1.	COMPREHENSION POWER	IC/T (Grades 4-6) Apple disk $425.00	(p. 35)
2.	HOW TO READ IN THE CONTENT AREAS	Educational Activities Apple disk $179.00	(p. 29)
3.	ACTIVE READER-WORLD OF NATURE SERIES ...	Orange Cherry Media Apple disk $67.00	(p. 42)
4.	ENGLISH BASICS	Educational Activities Apple disk $209.95	(p. 29)
5.	READ & SOLVE MATH PROBLEMS	Educational Activities Apple disk $85.00	(p. 29)
6.	INTRODUCTION TO DECIMALS	Educational Activities Apple disk $39.95	(p. 29)

$2,000 Budget

1.	CAPITALIZATION	Hartley Apple disk $49.95	(p. 33)
2.	DESCRIPTIVE READING	Educational Activities Apple disk $245.00	(p. 29)
3.	ADVENTURES AROUND THE WORLD	Orange Cherry Media Apple disk $84.00	(p. 42)
4.	PUNCTUATION	Educational Activities Apple disk $93.00	(p. 29)

Adult Basic Education (4-8) Instructional Level (continued)

5.	SPELLING BUILDER	Program Design Inc. Apple disk $26.50	(p. 43)
6.	INTERMEDIATE MATH SKILLS	Orange Cherry Media Apple disk $67.00	(p. 42)
7.	OPPOSITES	Hartley Apple disk $29.95	(p. 33)
8.	VERB USAGE	Hartley Apple disk $49.95	(p. 33)
9.	VERBS	Hartley Apple disk $32.95	(p. 33)
10.	HOMONYMS	Hartley Apple disk $39.95	(p. 33)
11.	NOUNS/PRONOUNS	Hartley Apple disk $32.95	(p. 33)
12.	ROOTS/AFFIXES	Hartley Apple disk $39.95	(p. 33)
13.	ANTONYMS/SYNONYMS	Hartley Apple disk $39.95	(p. 33)
14.	SPEED DRILL	Edu-Soft Apple disk $19.95	(p. 46)

Adult Basic Education (9-12) High School Equivalency

$1,000 Budget

1. COMPREHENSION POWER	IC/T Apple disk $575.00	(p. 35)
2. PERCENTAGES	Educational Activities Apple disk $45.00	(p. 29)
3. EQUATIONS	Educational Activities Apple disk $45.00	(p. 29)
4. BASIC MATH COMPETENCY SKILL DRILLS	Educational Activities Apple disk $203.00	(p. 29)
5. COMPU-MATH FRACTIONS, DECIMALS and ALGEBRA I	Edu-Ware Services Apple disk. $129.85	(p. 32)

ALSO RECOMMENDED

1. FRACTION CONCEPTS, DECIMAL CONCEPTS, RATIOS and PERCENTS	Mathware Apple disk $119.85	(p. 38)
2. VOCABULARY BUILDER I	Program Design Inc. Apple disk $23.95	(p. 43)
3. ENGLISH ACHIEVEMENT I-V	Microcomputer Workshops Apple disk $199.75	(p. 38)

Appendix E

ADULT EDUCATION SOFTWARE INSTITUTE

(Follow-up)

Appendix E

ADULT EDUCATION SOFTWARE INSTITUTE
FOLLOW-UP SURVEY

TRAINING

1. What types of microcomputer training experiences did you receive at MEC?

___ Demonstration
___ Software Review and Evaluation
___ Hands-on Experiences
___ Courseware Management
___ Hardware Operations

Briefly, which aspects of the training did you find most beneficial?

_____

_____

_____

2. To what extent have your MEC training experiences helped you to learn about micros and software? (Circle responses)

	Low			High
Increased knowledge about available computer applications.	1	2	3	4
Improved ability to evaluate software	1	2	3	4
Helped develop skills for utilizing micros with clients	1	2	3	4

SKILL APPLICATIONS

3. What skills have you been able to try or what new knowledge have you been able to apply as a result of your training?

	Have Done	Plan to Do
A. Have become aware of trends in technology.	___	___
B. Established some goals or objectives for computer use at your site.	___	___
C. Evaluated and identified useful software or materials for use by clients.	___	___
D. Successfully utilized software for instructional purposes.	___	___
E. Have made presentations to other staff members.	___	___
F. Have used computers to access large data bases for information.	___	___

4. Do you feel that clients at your site/center can benefit from using microcomputers?

____ yes ____ no

If yes, which area(s) of microcomputer application do you feel are most promising.

___ CAI (any subject)
___ Word processing
___ Reading tutorial
___ Math tutorial
___ Other:_____

5. If you have personally identified appropriate software that could be useful to you or your clients, please list titles below. (Limit to 3)

	TITLE	Actually Used: Yes	No
A.	_____	___	___
B.	_____	___	___
C.	_____	___	___

SKILL TRANSFER

		Yes	No
6.	Do you feel sufficiently confident in microcomputer applications to make presentations or to offer in-service training to colleagues?	___	___
7.	Have you already passed on information or offered in-service training to other adult educators?	___	___

8. How do you, or could you, make staff at your site/center aware of software or other applications?

_____

_____

9. What is the most immediate need for staff at your center enabling them to utilize the capabilities of computers?

_____

_____

What hardware is available to meet this need?

_____

Is there software available to meet this need?

_____

10. What are the most obvious needs in enabling your clients to make successful use of microcomputers at your site/center.

First: _____

Second: _____

Third: _____

Appendix F

ADULT EDUCATION CENTER

(Computerized Registration and Attendence Workshop)

Appendix F

ADULT EDUCATION CENTER

COMPUTERIZED REGISTRATION AND ATTENDANCE WORKSHOP

DATES : MAY 23 - MAY 24, 1984

LOCATION : MERRIMACK EDUCATION CENTER
CHELMSFORD, MA

TIME : 9:00AM - 4:00PM

TOPIC : OPERATION OF THE IBM XT AND USE OF THE DATA BASE SOFTWARE PROGRAM - POWER BASE.

OUTLINE

DAY 1

9:00 - 10:30	INTRODUCTION TO THE IBM XT Keyboard Printer Disk Drives Monitor
10:30 - 10:45	BREAK
10:45 - 12:15	USE OF THE DISK OPERATING SYSTEM Prepare a Disk Copy Directory Rename a File Hard Disk Backup
12:15 - 1:00	LUNCH
1:00 - 2:30	INTRO TO DATA BASES What is a Data Base What do they do Power Base
2:30 - 2:45	BREAK
2:45 - 4:00	OVERVIEW OF POWER BASE

DAY 2

9:00 - 10:30	HOW TO BUILD A FILE Defining the Data Structure Entering Data
10:30 - 10:45	BREAK
10:45 - 12:15	MANIPULATING THE DATA BASE Zoom Query
12:15 - 1:00	LUNCH
1:00 - 2:30	THE REGISTRATION AND ATTENDANCE SYSTEM File Structures Entering Data Printing Reports
2:30 - 2:45	BREAK
2:45 - 4:00	MODIFING THE SYSTEM Adding Files Ad Hoc Reports

Appendix G

PLANNING THE FUTURE OF ADULT SERVICES FORCES-AT-WORK SERVICES

Appendix G

PLANNING THE FUTURE OF ADULT SERVICES FORCES-AT-WORK ANALYSIS

Identifying *forces at work* in society in general or in the profession specifically that will force changes in the program of adult services in public libraries.

FORCES-AT-WORK WHEEL

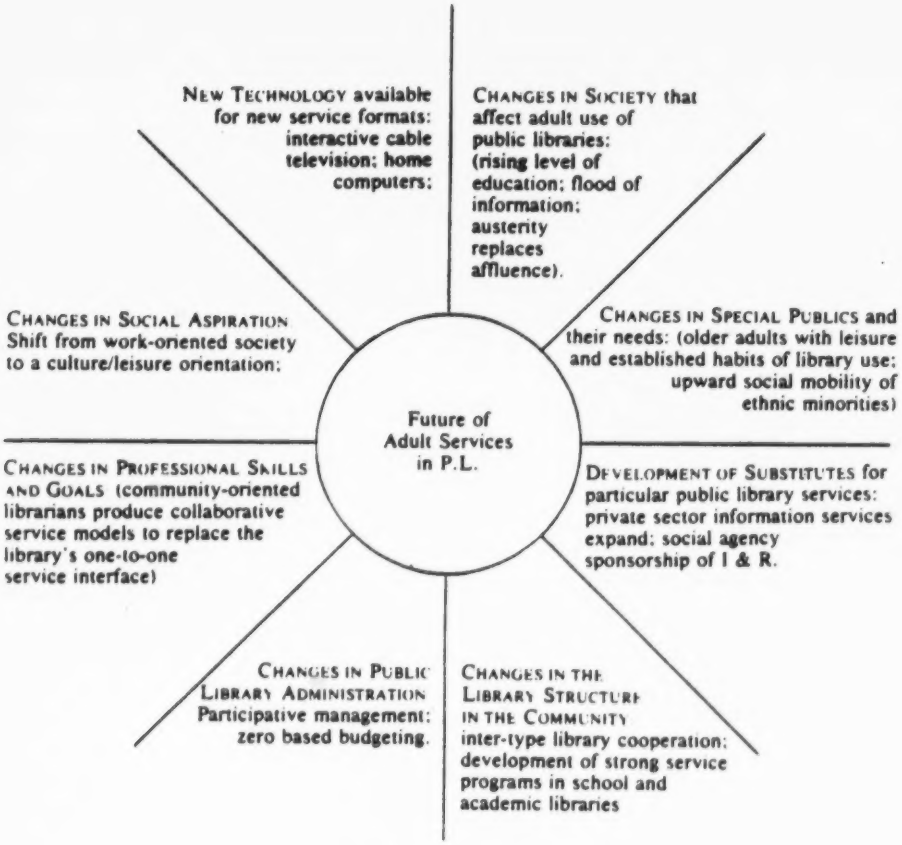
NEW TECHNOLOGY available for new service formats: interactive cable television; home computers;
CHANGES IN SOCIETY that affect adult use of public libraries: (rising level of education; flood of information; austerity replaces affluence).
CHANGES IN SOCIAL ASPIRATION Shift from work-oriented society to a culture/leisure orientation;
CHANGES IN SPECIAL PUBLICS and their needs: (older adults with leisure and established habits of library use; upward social mobility of ethnic minorities)
Future of Adult Services in P.L.
CHANGES IN PROFESSIONAL SKILLS AND GOALS (community-oriented librarians produce collaborative service models to replace the library's one-to-one service interface)
DEVELOPMENT OF SUBSTITUTES for particular public library services: private sector information services expand; social agency sponsorship of I & R.
CHANGES IN PUBLIC LIBRARY ADMINISTRATION Participative management; zero based budgeting.
CHANGES IN THE LIBRARY STRUCTURE IN THE COMMUNITY inter-type library cooperation; development of strong service programs in school and academic libraries

Fig. 1 Work Sheet A

Appendix H

COMPUTER CONCEPTS -- USER GUIDE

Continuous Learning Corporation

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F **Module IV. Databases** 71
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G **Glossary** 87

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Contained Reading Story - is read on Apple II 48K in the Continued Reading Format to develop rate with comprehension. Comprehension Check - ten multiple choice questions include: Recalling Details, Critical Thinking, Making Inferences, Main Idea. Vocabulary Check - written exercises using the key words. Package I - Black Beauty, Tom Sawyer, Call of the Wild - three Apple disks $189.00 Package II - Robinson Crusoe, Red Badge of Courage, Kidnapped - three Apple disks $189.00. Package III - Captains Courageous, Dr. Jekyll and Mr. Hyde, Time Machine - three Apple disks $189.00.

THE APPLE-BASED ELEMENTARY MATHEMATICS CLASSROOM LEARNING SYSTEM - SET 1 - WHOLE NUMBERS - Sterling Swift. 6 disks with lessons on Whole Numbers, Addition, Subtraction, Multiplication, Division, Games and Documentation. Learning management system. Disks begin with a Diagnostic placement test which generates a profile of the student and places him/her in the appropriate lesson. One set of lesson disks will maintain records of up to 200 students. (5 classes of up to 40 students each). 6 Apple disks $495.00.

FIGURE FUN - Sunburst. (Formerly MECC Elementary Volume 1). Number Games and Drills. Eleven math games and drills. Place values, metric conversion, approximating, estimating, prime factors, arithmetic and other basic numeric concepts and skills are covered in intriguing games. Extensive teacher's guide describes each program, lists the learning objectives, presents lesson plans, illustrates sample runs and includes reproducible worksheets for student use. Apple disk $30.00.

MEASURING UP - Sunburst. (Formerly MECC Elementary Volume 10). Quadrilaterals, Area and Perimeter. Four skillbuilding programs introduce students to basic geometric shapes. "Quadrilateral?" makes use of graphics and follow-up questions to show how parallelograms, rectangles, squares, rhombuses and trapezoids differ from each other. "Area and Perimeter" explores the properties of geometric shapes. Both tutorials end with a quiz that scores students on randomly selected questions. If more than two questions are missed, the student is directed to seek help. Extensive documentation. Apple disk $

MILLIKEN MATH Whole Numbers
divison). Operations with whole numbers.

Provides extensive practice in each area and the instructor can set the mastery level and number of problems for each student.

MINNESOTA MECC -- Automotive Math. The MINNESOTA Collection is available at MEC, 101 Mill Road, Chelmsford, Mass. for preview.

Instruction in math with an emphasis on vocational automotive knowledge. Two disks: Automotive Math I and Math II.

MINNESOTA MECC -- Automotive Math. The MINNESOTA Collection is available at MEC, 101 Mill Road, Chelmsford, Mass. for preview.

Science Volume 3, Earth and Life Sciences. Introduces students to ecology, biology, geology and astronomy with simulations and computer grahpics.

MINNESOTA MECC -- Automotive Math. The MINNESOTA Collection is available at MEC, 101 Mill Road, Chelmsford, Mass. for preview.WORD PROCESSORS

Basic Math, Elementary Math, Volume 1. A variety of drill programs includes speed drill for number facts, making change, and other programs for reinforcing basic math computation.

HOME WORD, MILLIKEN Word Processing, APPLE WRITER (see accompanying MINNESOTA MECC manual) and Bank Street Writer have become popular. For job placement, however, clients at adult learning centers will need to become familiar with more sophisticated word processing such as WANG, WORD STAR, or other major packages used primarily by industry.

HOMEWORD -- (Sierra On-Line) was available for the Spring semester to examine. The software uses pictures (icons); the participant can edit while writing without having to switch to the "edit" mode. A cassette tutorial is available that the client can use and a transcript of the tape is enclosed. Available at MEC, 160 Turnpike Road for preview.

Computer Learning Corporation --Computer literacy modules available with ___ diskettes, a User Guide and a Teacher's Manual.

FUNDAMENTAL SPELLING WORDS IN CONTEXT - Random House. Spelling drill and practice for students in grades 1-8. Words from basal spelling textbooks, The American Heritage Word Frequency Book, lists of spelling demons, and other lists of frequently used words. 308 lessons covering 5,280 words. Separate lessons for each grade level from 1 through 8. Each lesson centers on a particular spelling skill and presents spelling in context, rather than spelling words in isolation. Misspelled words are remembered by the computer and presented for review at the end of each lesson. TRS-80 cassette; Apple, TRS-80 disks $225.00.

FUNDAMENTAL PUNCTUATION PRACTICE - Random House. More than 30 lessons in punctuation skills: Periods; sentences; abbreviations and initials; question marks; commas; dates, addresses, quotes, conjunctions, subordinate clauses, series, interrupters, pauses; exclamation marks; apostrophes; quotation marks; semicolons; parenthesis. TRS-80 cassette; Apple, TRS-80 disk $150.00.

PUNCTUATION SKILLS: Commas - Milton Bradley. Introductory elements, items in a series, interrupting elements, independent clauses, dates, addresses, letters and titles. Apple disk $49.95.

IMPROVING YOUR PUNCTUATION - Random House - BLS. Reading level 8-9. Content level 9+. A Comprehensive collection of 17 Apple 48K disks on all aspects of punctuation, including and punctuation, semi-colon, colon, dash, quotation marks, parenthesis, brackets, underlining, italics, apostrophe and hypen - Apple disks. $867.00

CAPITALIZATION 5-6 Random House - BLS. 4 disks $216.00

CAPITALIZATION 7-8 - Random House - BLS. 6 Apple disks $324.00

IMPROVING SENTENCE STRUCTURE - Random House - BLS. Reading level 8-9, Content Level 9+. Six disks on PARALLEL STRUCTURE: SHIFTS IN PERSON & SUBJECTS: SHIFTS IN TENSE & SHIFTS IN MOOD: SHIFTS IN VOICE. Apple $60.00 each, all 5 for $270.00

IMPROVING YOUR STYLE - Random House - BLS. TECHNIQUES IN SUBORDINATION OF IDEAS: SIMPLE, COMPLEX AND COMPOUND SENTENCES: VARIETY IN WORD ORDER AND SENTENCE LENGTH. Apple $60.00 each, all 4 for $216.00.

SUBJECT-VERB AGREEMENT + COMPOUND SUBJECTS - Random House - BLS. Apple

SUBJECT-VERB AGREEMENT IN SPECIAL CASES - Random House - BLS. Apple disk. $60.00

PRONOUN & UNCLEAR REFERENCE - Random House - BLS. Apple disk. $60.00.

AGREEMENT AND IMPERSONAL PRONOUNS - Random House - BLS. Apple disk. $60.00

DANGLING VERB PHRASES - Random House - BLS. Apple disk $60.00

MISPLACED PHRASES + PASSIVE VOICE - Random House - BLS. Apple disk $60.00.

IMPROVING YOUR GRAMMAR - Random House - BLS. All 6 of the above $324.00

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READING COMPREHENSION III - Random House-BLS. Reading Level 7-8, Content level 7-10. 16 Apple diskettes, available separately at $60.00 each: Information in the Dictionary; Using the Pronunciation Guide; Homographs and Homonyms; Using Meanings and Definitions; Derived and Irregular Forms; Following Oral and Graphic Instructions; Using Symbols and Automatic Machines; Codes and Arithmetic; Exercises in Following Diretions; Paraphrasing Key Words and Inferences; Sentence Paragraph Relations; Facts Relating to Paragraphs, Words and Paraphrases; Main Facts and Key Ideas; Inferences Purposes and Conclusions (2 disks $60.00) All 16 Apple 48K disks $816.00.

READING COMPREHENSION IV - Random BLS. Reading Level 9-10, Content level 8+. 13 Apple disks available separately for $60.00 each: Choosing a Topic; Selecting Appropriate Informations; Using the Encyclopedia; Finding Sources - The Card Catalog and Reader's Guide; Paraphrases, Inference and Point of View B; Symbols and Directions; Paraphrases, Inference and Point of View C; Source of Reference; Using Internal and External Evidence; Assumptions and Elements of Humor; Theme Style and Metaphor (2 disks $60.00) and Implication, Attitude, Symbolism, Image and Onomatopoeia. All 13 Apple 48K disks $663.00

PLANE FACTS ABOUT GEOMETRY - Sunburst. (Formerly MECC Mathematics Volume 3). Formulas, Shapes, and Skills. Five programs make extensive use of graphics to teach basic geometric shapes and give definitions and formulas for rectangles, squares, parallelograms, trapezoids, rhombuses and triangles. A drill-and-practice program called "Geometric Shapes" leads off, followed by four tutorials with drill-and-practice options. "Perimeters" shows how to calculate perimters of the six basic geometric shapes. "Rectangle and Square Areas" helps students calculate the areas of rectangles and squares. "Parallelogram Areas" compares formulas for determining a parallelogram and rectangle aeas, while "Trapezoids and Triangle Areas" does the same for the areas of these two geometric shapes. Extensive documentation. Apple disk $30.00.

FRACTION/DECIMALS - Sterling Swift - AVAILABLE IN ENGLISH OR SPANISH, (Please specify) Six Apple diskettes on Meaning/Equivalence/Order of Fractions; Addition and Subtraction of Fractions; Multiplication and Division of Fractions; Decimals, Games; learning Management System Embedded Mastery Tests, Diagnostic/Prescriptive Functions, Achievement Record-keeping Capability, Information Reports; Plus Documentation. Apple disk $495.00.

FRACTIONS - A REVIEW COURSE - Random House - BLS. 15 Apple disks. 4 on introduction to fractions: the fraction ideas, comparing fractions; factors and prime numbers; multiples and lowest common multiples ($60.00 each, all four for $216.00); 4 on addition of fractions and mixed numbers ($216.00); and 7 on subtraction, multiplication and division of fractions ($120.00) and one General Review ($60.00). All of the above, 15 48K Apple disks, $765.00.

DECIMALS - A REVIEW COURSE - Random House - BLS. 13 Apple disks. 4 on decimals, Fractions and Equivalents ($216.00); 5 on Addition, Subtraction and Multiplication of Decimals ($270.00); 4 on Division of Decimals ($216.00). All 13 of the abvove $663.00.

PERCENTAGE - A REVIEW COURSE - Random House - BLS. 13 Apple disks. 3 on Fractions, Decimals, and Percents: Changing Fractions to Percent, Changing Percent to Fractions, Decimals and Percent ($60.00 each, all 3 for $162.00); 5 on Percentage Exercises Problems ($270.00) 5 on Discount, Taxes, Salaries and Profits: Discount, Taxes, Commissions, Interest, Profit + Loss, and Increase + Decrease ($60.00 each, all 5 for $270.00). All of the above 13 48K Apple disks $663.00.

ARITHMETIC FUNDAMENTALS - Random House - BLS. A comprehensive course on addition, subtraction, multiplication and division of whole numbers, fractions, mixed numbers, decimals, percents, measures and algebraic numerals. 19 Apple 48K disks $969.00.

THE CLASSICS SERIES - A/V Concepts. Reading levels 2-4. This series of classic novels has been adapted and rewritten at appropriate readability levels for students who find reading the original versions too difficult. Each classic novel has been adapted into ten short chapters/stories using the Contained Reading format. Each classic story is divided into 10 mini-story lessons. Each mini-story lesson stands alone and serves to stimulate continuing interest. Key Words are defined and used in context. Survey and prereading techniques are developed.

TUTORIAL COMPREHENSION - Random House. Tutorial lessons on Main Ideas, Details, Sequence, Inference, and Critical Reading. Available separately for $215.00 each TRS-80 cassette, $255.00 each Apple, TRS-80 48K disk. All five TRS-80 cassettes for $840.00; Apple TRS-80 48K disk $995.00.

FUNDAMENTAL WORD FOCUS - Random House. Drill on alphabetical order; syllabication; prefixes; suffixes; compound words; vowels; syllables and other word management skills. TRS-80 cassette $120.00; Apple, Atari 800, TRS-80 disk $165.00.

READING COMPREHENSION I - Random House - BLS. A comprehensive collection of 15 Apple disks, on the 3-4 grade reading level, available separately for $60.00 each: Discovering Books; Book Classics; Finding People, Places and Things; Reading Word and Letters Carefully, Using Directions to Go Places; Doing Things in Order; Read It All; Understanding What You Read; The Order of Events; Interpreting and Remembering What you Read (2 disks, $60.00); Reading Between the Lines; Think As You Read; Adding Up Details; Learning About Characters. All 15 Apple 48K disk $714.00.

READING COMPREHNSION II - Random House - BLS. Reading Level Grade 5-6. Content level 4-7. 12 Apple diskettes, available separately at $60.00 each: Basic Library Skills; Finding the Book You Want; Graph and Map Reading; Counting Roman Numerals and Walking Directions; Words Cut and Tongue Twisters; Solving Problems by Following Directions; Related Sentences and Identification of Paragraphs; Figures of Speech, Inference Facts; Main Ideas; Title and Turning Points, and 3 disks on Understanding Paragraphs ($162.00 for all 3). Package also includes 4 test diskettes for a total of 16 Apple 48K diskettes $612.00.

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